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A related formation of higher growth is the "macchia," which in some regions succeeds the heath. In it the Ericaceae become less abundant with the increase in size of the woody plants, but such genera as *Protea* and *Rhus* have more representatives, while associated with them are species of *Olea*, *Celastrus*, *Leucadendron*, and many other genera.

On the southeastern slopes facing the Indian Ocean, the greater summer rainfall produces a mesophytic forest, often dominated by *Podocarpus* or by *Rhus longifolia* and *Albizzia fastigiata*.

Grassland, much of it interspersed with scattered trees or shrubs, known variously as *Acacia* veld, *Protea* veld, or bush veld, extends through much of Natal, Transvaal, and Rhodesia. The tree veld becomes increasingly arid toward the west and includes much of Great Namaqualand and Damaraland. Northward the vegetation becomes more luxuriant, passing to rich grasslands with large trees of the baobab, *Adansonia digitata*, and of *Copaifera mopane* in Angola.

In dry river valleys of Natal and elsewhere, a rather rich scrub formation is found, characterized by tree species of *Euphorbia*, *Aloe*, and *Mesembryanthemum*, and succulent or semisucculent lianas, in addition to the more woody shrubs and trees.

Finally, there is the Karroo with a rainfall of 8-35 cm., and a vegetation of dwarf shrubs, leaf and stem succulents, bulbous plants, a few grasses, and some annuals. BEWS is inclined to class this with the grassland rather than with the desert. He finds, in fact, that there is little true desert in South Africa, the so-called "Kalahari desert" also being more truly veld or grassland.—GEO. D. FULLER.

Effect of fungi on fruits.—HAWKINS¹⁵ has studied the effect of the brown-rot fungus upon the chemical composition of the peach, and CULPEPPER, FOSTER, and CALDWELL¹⁶ have made a similar but more complete study of the changes in the apple during decay by the black-rot fungus. *Sclerotinia cinerea* increases acidity of the peach during decay. Among the carbohydrates the pentosans are not attacked; the alcohol-insoluble portion which reduces Fehling's solution after being hydrolyzed with dilute hydrochloric acid is slightly decreased; and the total sugar content is much decreased. The sucrose practically disappears during decay; its inversion occurs more rapidly than the resulting reducing sugars are used by the fungus. As a result, the percentage of reducing sugars in the decaying fruit is greater than in the sound fruit, although the total sugar content is less.

¹⁵ HAWKINS, LON A., Some effects of the brown-rot fungus upon the composition of the peach. *Amer. Jour. Bot.* 2: 71-81. 1915.

¹⁶ CULPEPPER, CHARLES W., FOSTER, ARTHUR C., and CALDWELL, JOSEPH S., Some effects of the black-rot fungus, *Sphaeropsis malorum*, upon the chemical composition of the apple. *Jour. Agr. Research.* 7: 17-40. 1916.

In the case of the apple, the lipoids are attacked and decreased, but later a large amount of lipid is constructed in the fungus itself. Non-protein nitrogen of the apple is converted into protein nitrogen of the parasite, decrease of the former paralleling increase of the latter; but some nitrogen loss results from complete decomposition of nitrogenous compounds with liberation of ammonia. The lipid phosphorus and protein phosphorus of the apple are first broken down into soluble form, and then reconstructed into protein phosphorus within the parasite. The sugars decrease rapidly as the disease proceeds. The disaccharides are used much less rapidly and completely than the monosaccharides. The starch content remains unchanged. Acidity decreases, for the malic acid of the apple is decomposed without the formation of any other acids by the organism, and a large amount of alcohol is formed from soluble carbohydrates. The authors claim a fairly complete statement of the chemical differences between sound and black-rot diseased apples.—CHARLES A. SHULL.

Tropical vegetation.—In a botanical travelogue, GLEASON¹⁷ has described in a semi-popular way so many phases of vegetation as to make his series of articles an excellent one for visualizing the diversity and luxuriance of tropical forests. Japan with its intensive cultivation of all available land has so little natural vegetation that it becomes insignificant compared with the Philippines. Here the reader is guided through a forest remarkable for luxuriance and rapidity of growth, and made acquainted with many lianas, epiphytes, and strangling figs or “baletes,” without losing sight of the stratification of tree growth. Interruptions of the forest growth made by the natives in their attempts at agriculture are seen in the rapid reforestation of the “parangs,” or when fire has intervened in the grassy “cogons.” Among other matters of botanical interest is the action of volcanoes, like that of Taal, in destroying vegetation and thus furnishing a splendid field for the study of plant reestablishment and succession.

At Java the Botanic Garden of Buitenzorg with its 16,000 species of plants and the less known but not less interesting economic garden were visited. In the latter collections of such different rubber plants as *Ficus*, *Hevea*, *Castilloa*, and *Manihot* growing side by side seem to abound. The mountain garden at Tjibodas was visited also and the beauties and advantages of these collections of tropical plants are pointed out. A similar visit to the garden at Peradeniya and excursions to examine various types of vegetation upon the island of Ceylon complete the tour.—GEO. D. FULLER.

Potamogeton.—HAGSTRÖM¹⁸ has published an elaborate monograph on *Potamogeton*, in which the classification is based largely upon anatomical

¹⁷ GLEASON, H. A., Botanical sketches from the Asiatic tropics. I. Japan; II. Philippines; III. Java; IV. Ceylon. *Torrey* 15:93-101, 117-133, 139-153, 161-175, 187-202, 233-244. 1915; 16:1-17, 33-45. 1916.

¹⁸ HAGSTRÖM, J. O., Critical researches on the Potamogetons. Kgl. Svensk. Vetensk. Handl. 55:no. 5. pp. 281. figs. 119. 1916.